EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

Time allowed

57 Minutes

Score /47

Percentage %

Biology

AQA
AS & A LEVEL

Mark Scheme

3.8 The control of gene expression

1 (a) 1. To allow comparison;

2. Because different number of cells in samples / different times for incubation / numbers become easier to manipulate;

2

(b) 203.7(%);;

Allow 1 mark for 21.8 / 10.7

Allow 1 mark for correct answer (203.74) but not correctly to 1 dp

204 = 1 mark

2

(c) (i) 1. (At every concentration) uptake is faster at 37°C / at higher temperature;

2. Due to faster respiration / ATP production;

2

(ii) 1. Uptake at 37°C only small increase / levelling off / almost constant as carrier proteins full;

Accept 'no (significant) change'

Ignore use of numbers

2. Concentration of imatinib is not the limiting factor;

2

[8]

2 (a) 1. Rank all STs in ascending order;
2. Find value with same number (of people) above and below.

Accept find middle value

2

(b) Not ethical to fail to treat cancer.

1

(c) Yes since with ipilimumab:

1. Median ST increased by 2.1 months;
2. Percentage of patients showing reduction in tumours increased from 10.3% to 15.2%;

No because:

3. No standard errors shown / no (Student) t- test / no statistical test carried out;
4. (So) not able to tell if differences are (statistically) significant / due to chance (alone);
5. Improvement might only be evident in some patients / no improvement in some patients;
6. Quality of (extra) time alive not reported;

If answers relate only to 'Yes' or 'No', award 2 marks max

4 max

(d) 1. Faulty protein recognised as an antigen / as a 'foreign' protein;
2. T cells will bind to faulty protein / to (this) 'foreign' protein;
3. (Sensitised) T cells will stimulate clonal selection of B cells;
4. (Resulting in) release of antibodies against faulty protein.

3 max

[10]

3 (a) 1. Methylation prevents transcription of gene;
2. Protein not produced that prevents cell division / causes cell death / apoptosis;
3. No control of mitosis.

3

(b) 1. Scatter graph;
2. Fat on *x* axis and death rate on *y* axis;
3. (Because) looking at relationship between two discrete / independent variables.

3

(c) 1. (Trend) shows positive correlation / shows the more fat in diet, the higher death rate from breast cancer;
2. But number of points off line / anomalies.

2

[8]

4 (a) (i) 1. (Tumour suppressor) gene inactivated / not able to control / slow down cell division;

Ignore: references to growth

2. Rate of cell division too fast / out of control.

1 and 2 Accept: mitosis

1 and 2 Reject: meiosis

2

(ii) 1. (Genetic) code degenerate;

Accept: codon for triplet

Accept description of degenerate code, e.g. another triplet codes for the same amino acid

2. Mutation in intron.

Accept: mutation in non-coding DNA

1 max

(b) 1. Antibody has specific tertiary structure / binding site / variable region;

Do not accept explanations involving undefined antigen

2. Complementary (shape / fit) to receptor protein / GF / binds to receptor protein / to GF;

Ignore: same shape as receptor protein / GF

3. Prevents GF binding (to receptor).

3

[6]

5 (a) 1. Removes (main / largest) source of oestrogen / (different) mice produce different amounts of oestrogen;

Accept: so oestrogen from ovaries not a confounding variable − idea of.

2. (Allows) oestrogen to be controlled / oestrogen to be made by aromatase only / only oestrogen made in lungs to be involved.

Reject: references to injection of aromatase.

2

(b) 1. (Anastrozole) prevents / reduces oestrogen production;

2. (Fulvestrant) stops remaining oestrogen binding / less oestrogen binds to receptors.

Note: brackets around drug names.

2

(c) (Yes for Group T)

1. Least tumours per animal (from fig. 1);

Accept: 'mean values' for tumour area.

2. Lowest (mean) tumour area / size (from fig. 2);
3. Lowest top of range;

(But)

4. Means (tumour area) are similar;

Where candidates confuse range and standard deviation, do not give credit.

5. Ranges overlap / share values so differences may not be real / treatments may be just effective in reducing tumour;

Ignore significance

6. Range affected by outliers / SD's would be better;
7. Done on mice / not done on women / humans;
8. Only 10 mice used per group / small sample size so may not be representative / reliable;
9. Might be side effects;
10. Only did for 15 weeks so maximum effect of drugs may not have been seen.

5 max

(d) 1. Tumours may be different depths / area does not take depth into

account / tumours are 3-D / are not 2-D;

Neutral: different sizes

Accept: height / thickness for depth

2. (Measure) tumour volume / mass / weight.

2

(e) 1. Allows tumours to grow / develop / form;

Neutral: gives drug more time to work.

2. (So) can investigate treatment rather than prevention (of tumours) / when tumour / cancer is more advanced.

Accept: to see whether it can destroy / treat / stop growth of a tumour (that already exists) / to allow / assess treatment of a tumour

2

(f) 1. Unethical (not to treat patients) / may increase probability of patients dying / getting more ill;

Reject: references to giving people tumours

2. Use normal cancer drugs / treatment.

Accept: named type of cancer treatment, e.g. chemotherapy

2

[15]